

# Enhanced Conventional Nozzle Technologies

by  
**Husky Corporation**

Presented to  
**DNREC Committee**

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# Overview

- CARB Regulation Status
- DNREC Requested Information
- Husky Technologies That Meet Regulation
- Husky Product Offerings
  - Safe-T-Squeeze
  - Eco Nozzle
  - Model 10S Dripless
- Summary

# CARB Regulation Status


- April 2013 Workshop – Regulation Proposed
  - Defined performance requirements for Eco nozzles- Spillage, drips, retention & spitting
  - Enhancements Applicable to ORVR Fleet Fueling Facilities Only
- March 2014 Workshop – Update provided
- Remaining open issue:
  - Applicable facilities not well defined
- Next Board Hearing: November 2014

# DNREC Requested Nozzle Details

- Technical features that enable meeting CARB proposed standards
  - Spitting
  - Post-Refueling Drips
  - Liquid Retention
  - Spillage
- Compliance tests completed or planned
- Product availability
- Cost estimates

# Design Features – No Spitting

- Spitting (TP-201.2E):
  - Allowable:  $\leq 1.0$  ml/nozzle/refueling
  - Brief Testing Description: With dispenser in OFF position, remove nozzle from holster at waist height. Point spout into graduated cylinder, pull nozzle trigger and hold in fully open position. Hold until there is no flow of gasoline for 10 seconds.
  - Design Feature: Husky interlock disables the trigger until nozzle is inserted into the fill pipe, so no gasoline is allowed to spit.
  - Completed Tests: Design verified in lab and in the field
  - Tests Planned: CARB test site

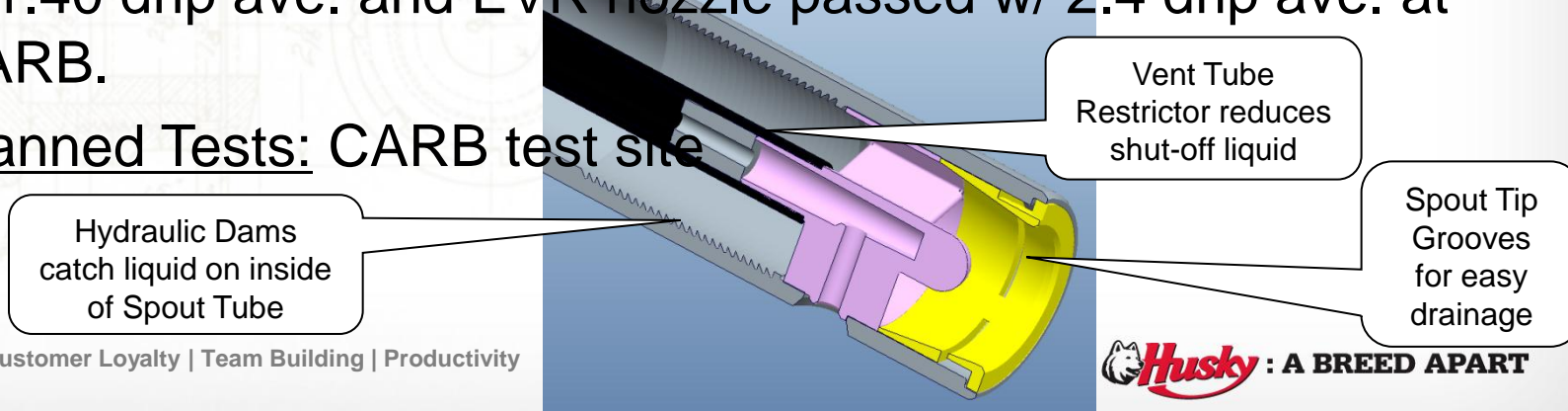


Interlock Push Pin – Interfaces with bellows and interlock mechanism

Interlock Rocker Mechanism

# Design Features – Post-Refueling Drips

- Post-Refueling Drips (TP-201.2D):
  - Allowable:  $\leq 3$  drops/refueling
  - Brief Testing Description: After nozzle shuts off from refueling, wait 10 seconds, remove spout from fillneck, slowly tilt spout straight upward, tilt spout straight downward and hold for 5 seconds. Count drips once spout leaves fill neck until after 5 seconds.
  - Design Features: Ridges in spout tube and bushing to capture liquid. Drain holes in components to avoid pooling.
  - Completed Tests: Ft. Benning EPA/DOD, Model 10 passed w/1.40 drip ave. and EVR nozzle passed w/ 2.4 drip ave. at CARB.
  - Planned Tests: CARB test site



# Design Features – Liquid Retention

- Liquid Retention (TP-201.2E):
  - Allowable:  $\leq 100$  ml/1000 gals
  - Brief Testing Description: Point nozzle into funnel attached to graduated cylinder. Walk away from the dispenser to completely stretch hose while keeping nozzle close to the ground. Hold for 15 seconds minimum OR until flow stops.
  - Design Feature: Husky check valve retains fuel inside of nozzle. All liquid in hose retained by closed poppet seal.
  - Completed Tests: EVR nozzle passed w/ 35.4 ml/1000 gals at CARB
  - Planned Tests: CARB Test Site



# Design Features - Spillage

- Spillage (TP-201.2C):
  - Allowable:  $\leq 0.24$  pounds/1000 gals
  - Brief Testing Description: Observe customers and record pre-fueling, fueling, spitback and post-fueling spillage by measuring drops and/or the spill area. Use calibration procedure to determine fuel volume from spill area.
  - Design Features: The interlock mechanism, check valve and dripless spout features all combined.
  - Completed Tests: EVR nozzle passed w/ .004 lbs/1000 gals at CARB.
  - Planned Tests: CARB test site

# Safe-T-Squeeze Nozzle – 1<sup>st</sup> Gen

- Features:
  - Meets spillage, retention, drips and spitting requirements.
  - Lever force < 5 lbs.
  - Lightweight construction (3.1 lbs.)
- CARB Approval Status:
  - Preliminary test results – all passing
- Production: Currently available
- Cost: ~\$275-\$300. Lower cost once in full production.



# Eco Nozzle – 2<sup>nd</sup> Gen

- Features:
  - Meets spillage, retention, drips and spitting requirements.
  - Lever Force < 5 lbs.
  - Interlock Actuation Force < 5 lbs.
  - Lightweight construction (2.7 lbs.)
  - Slim profile vs. Large bellows
- CARB Approval Status:
  - Preliminary test results – all passing
- Production: 4<sup>th</sup> QTR 2014 (est.)
- Cost: Less than current vapor recovery nozzles (~\$115)



# Model 10S Dripless w/ EZ Lever

- Features:
  - Meets spillage, retention and drip requirements
  - EZ Lever (force < 5 lbs.)
  - High Impact Polymer Hand Guard
  - Lightweight construction (2.3 lbs.)
- Production: 4<sup>th</sup> QTR 2014(est.)
- Cost: ~\$65



# Summary

- CARB Eco Nozzle Regulations
  - Due November 2014 (est.)
- Three nozzle choices:
  - Safe-T-Squeeze
  - Eco Nozzle
  - 10S Dripless w/ EZ Lever
- Questions?